Notice of Allowability	Application No.	Applicant(s)	
	10/603,291	HSU ET AL.	
	Examiner	Art Unit	
	Jack Dinh	2873	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *03/22/04*.

2. ☒ The allowed claim(s) is/are *1-8*.

3. ☒ The drawings filed on *25 June 2003* are accepted by the Examiner.

4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☒ All b) ☐ Some* c) ☐ None of the:
      1. ☒ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date 0304
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date *0504* .
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

Georgia Epps
Supervisory Patent Examiner
Technology Center 2800

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

1. Authorization for this examiner's amendment was given in a telephone interview with Joseph J. Orlando on 05/27/04. The application has been amended as follows:

In the claims:

Claim 1. (currently amended) A method for manufacturing a combined solid immersion lens (SIL) and submicron aperture, comprising the following steps:

(i) providing a substrate;

(ii) depositing a sacrificial layer on the substrate;

(iii) coating a first photoresist layer on the sacrificial layer, and using photo-lithography to pattern said first photoresist layer to define an initial aperture;

(iv) performing reflow process on said first photoresist layer to make edge of the aperture round and smooth and form a cone-shaped aperture;

(v) performing over-etching process to remove the sacrificial layer below the aperture;

(vi) depositing a conductive material on the reflowed first photoresist layer as a current conducting layer;

(vii) performing electroplating to reduce the aperture size;

(viii) coating a second photoresist layer on the electroplating layer, and using photo-lithography to pattern said second photoresist to define a cylindrical ~~phtoresist~~ photoresist structure,

(ix) applying a high temperature thermal reflow to allow the cylindrical photoresist structure to form a hemi-sphere shaped lens; and

(x) removing the subtrate.

Claim 8. (currently amended) The device according to Claim ~~4~~ 7 wherein said first photoresist layer and the second photoresist layer may use the same or different material, and said third photoresist layer should not use the same material as said second photoresist layer.

REASONS FOR ALLOWANCE

2. Claims 1-8 are allowed. The following is a statement of the examiner's reasons for allowance. The present invention relates to a method for manufacturing a combined solid immersion lens and submicron aperture, and device thereof. More specifically, independent claim 1 reads on a method for manufacturing a combined solid immersion lens and submicron aperture that is distinguished over the prior art by the unique sequential steps comprising providing a substrate, depositing a sacrificial layer on the substrate, coating afirst photoresist layer on the sacrificial layer, and using photolithography to pattern the first photoresist layer to define an initial aperture, performing reflow process on the first photoresist layer to make edge of the aperture round and smooth and form a cone-shaped aperture, peforming over-etching process to remove the sacrificial layer below the aperture, depositing a conductive material on the reflowed first photoresist layer as a current conducting layer, performing electroplating to reduce the aperture size, coating a second photoresist layer on the electroplating layer, and using photolithography to pattern the second photoresist to define a cylindrical photoresist structure, applying a high temperature thermal reflow to allow the cylindrical photoresist structure to form a hemisphere shaped lens, and removing the substrate. Regarding independent claim 4, the prior art fails to disclose that the aperture is made of a first photoresist layer by using photolithography and the first photoresist layer is coated on a sacrificial layer which is deposited on a silicon substrate, and the SIL is made of a second photoresist layer above the aperture by using photolithography. The claimed invention is therefore considered to be in condition for allowance as being novel and non-obvious over prior art.

3. The prior art taken either singly or in combination fails to anticipate or fairly suggest the limitations of the independent claims, in such a manner that a rejection under 35 USC 102 or 103 would be improper. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Other Information/Remarks

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Xu et al. (U.S. Patent 6,633,439), Kasono et al. (U.S. Patent 6,194,129), Shimada et al. (U.S. Patent 6,335,522), and Katayama (U.S. Patent 6,714,499) disclose various methods for manufacturing a combined solid immersion lens (SIL) and submicron aperture, and device thereof.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jack Dinh whose telephone number is 571-272-2327. The examiner can normally be reached on M-F (9:30 AM - 6:00 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Y Epps can be reached on 571-272-2328. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jack Dinh

Georgia Epps
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